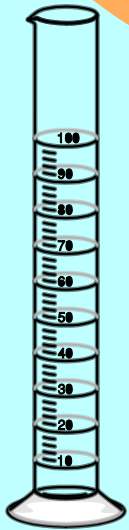


Chapter One

Data Management



Data Management: an effective way to collect, organize, represent, display and analyze data.
Ex: Sports, Medicine, farming, etc...



1.1 Variables and Relationships

Curriculum Outcomes	Related Activities	Page in Text
<ul style="list-style-type: none">gather data, plot the data using appropriate scales, and demonstrate an understanding of independent and dependent variables, domain, and range (pages 2, 3)	<ul style="list-style-type: none">identify the factors (variables) that interact to affect tree growth	2
	<ul style="list-style-type: none">identify independent and dependent variables in the relationships and discuss which variables can be controlled	3
<ul style="list-style-type: none">design and conduct experiments using statistical methods and scientific inquiry	<ul style="list-style-type: none">design and carry out experiments and organize data that demonstrates the effect of controlling all but one independent variable in an investigation	4
<ul style="list-style-type: none">solve problems by modeling real-world phenomena	<ul style="list-style-type: none">represent the relationship using a mind map	6

Cause-and-effect relationships

- When a change to one variable causes a change in another variable.

Variables: any measured quantity that changes in an experiment or relationship.

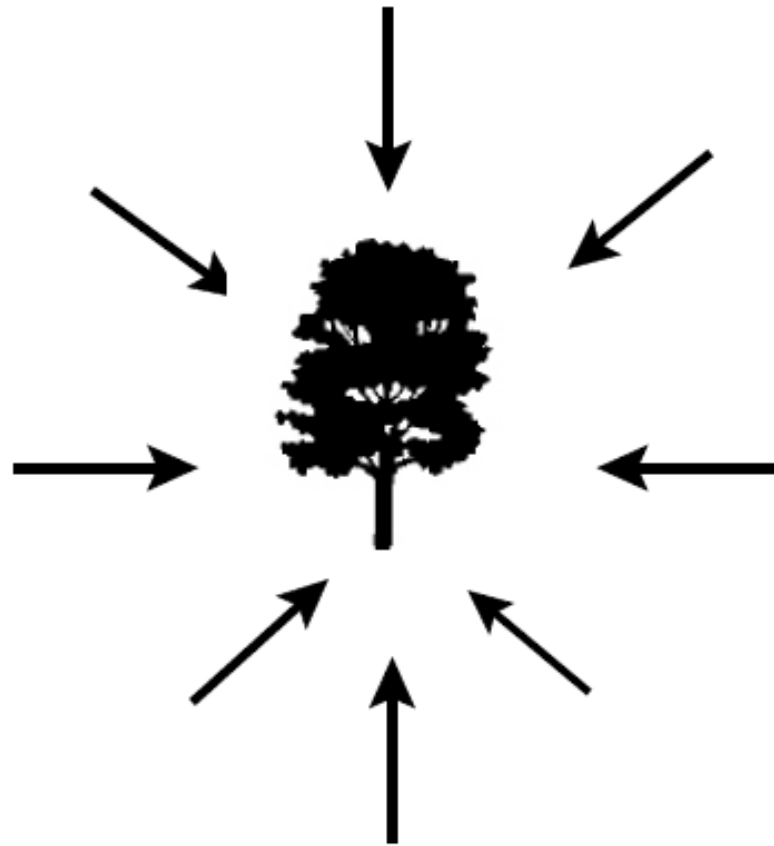
There are three types of variables:

- 1) **independent variable**: a factor or factors that affect another factor in an experiment or relationship, it is the cause which affects an outcome. Ex: rainfall, vehicle traffic, etc.
- 2) **dependant variable**: is the factor that is affected by other factors in an experiment or relationship, it is the effect which occurs after particular factors are presented Ex: the amount of tree growth.
- 3) **controlled variable**: any independent variable whose value is held constant during an experiment.

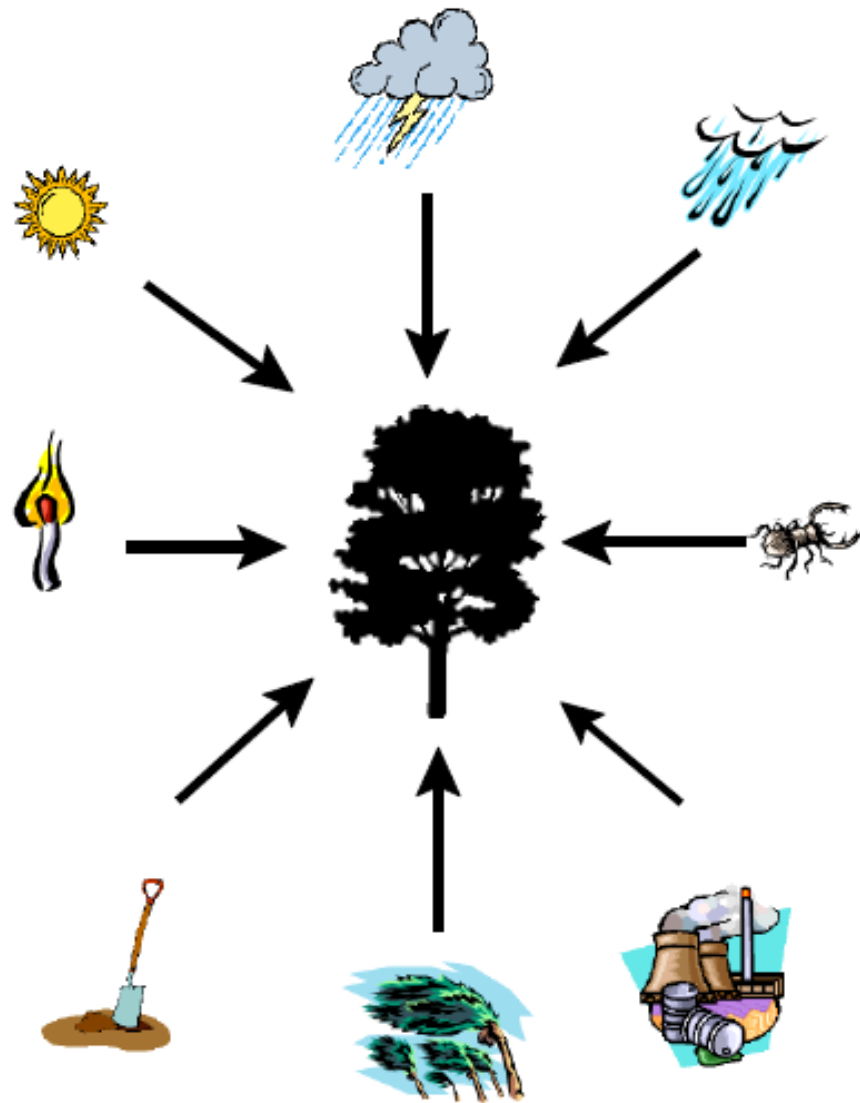
Focus Question

Page 3

Factors Affecting Tree Growth



Factors Affecting Tree Growth



Do Questions Page 3 #2,3

we will discuss these in 15 minutes
(if you finish early, read over Pg.4)

2.a) Dependent variables might be:

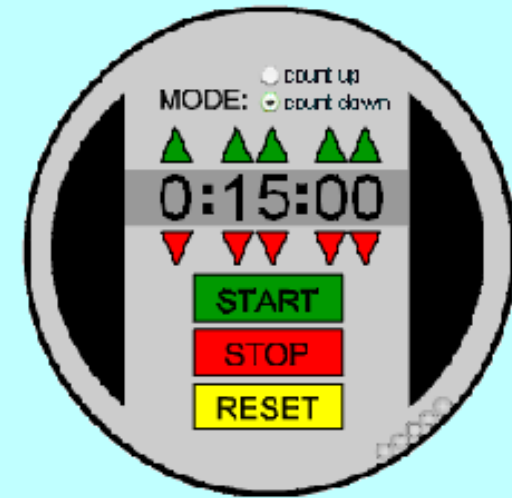
- corn height
- number of corn cobs per stalk
- moisture content
- amount of money earned from corn sold

Independent variables might be:

- rainfall
- type of corn
- distance between rows

2.b) Examples: Distance between rows, type of corn planted

2.c) Example: For moisture content, if the farmer irrigated more, the corn might have a higher moisture content.



Do Questions Page 3 #3

3.a) The distance jumped depends on other variables.

3. b) and c)

Factors influenced by the Designer	Factors influenced by the Skier	Factors Outside the influence of Anyone
<ul style="list-style-type: none">• Ramp length• Angle of ramp• Amount of artificial snow• platform that the skiers jump from	<ul style="list-style-type: none">• Style and make of the skis• Wax put on the skis• "push" they give at the end of the ramp• Position they hold going down the ramp	<ul style="list-style-type: none">• Wind speed and direction• Air temperature• Ice formed on the ramp• Snowfall

3.d) Factors such as ramp length affect the distance jumped but are independent of, or not affected by, the distance jumped.

Focus B, Page 4

- A controlled experiment:
 - all but one variable is controlled so the effect can be studied.
 - this means that the controlled variable can be changed
 - this allows the scientist to know the effect of this variable
- length of time for glue to dry - dependent or independent variable?
- Independent variables:
 - air temperature
 - air movement
 - type of glue
 - size of spot of glue
 - others?
- What is a possible experiment?
- Would all the independent variables affect the time?

Focus Question #4, Page 4

Dissolving-sugar experiment

(a) Independent Variable (controlled)	(b) Suggestions for Controlling Factors	Likelihood It will work (0-5) 0 - won't work 5-likely to work 7-don't know
Water volume	Increase or decrease	3
Water temperature	Increase or decrease	5
Mass of sugar	Increase or decrease	3
Shape of container	Use different shapes	0
Water purity	Use distilled and tap water	?
Amount of stirring	Increase or decrease	?

4. a) Other Examples: type of sugar (icing, brown, and so on) and whether the sugar is cubed or granular
4. b) Examples: increase the temperature of the water, or stir more vigorously
4. c) These need to be controlled: water vol. and purity, temp. of water, amount of stirring, shape of container, type of sugar.

Homework

Do questions Pg.5 #5,6

#5 Variables and Relationships (#5, pg 5)

Section 1.1

Event	Independent Variable(s)	Dependent Variable(s)	Cause & Effect Relationship? (Y/N)
1) The length of a candle and the amount of time it has been burning.			
2) The mark you get on a test and the time you spend studying.			
3) The speed of a car and the distance from the nearest gas station.			
4) The length of a movie and the admission price.			
5) The age of a car and its current value.			
6) The population of a community and its distance from the coast.			

Page 5 #6

An apprentice clockmaker is investigating the movement of a pendulum in a grandfather clock. The period (τ) of a pendulum is the time it takes for the pendulum bob to make one complete swing (back and forth).

- (a) List several variables that you think might affect the period.
- (b) List the dependent and independent variables. Describe a set of experiments that you could conduct to find out which of the independent variables affect the period.